

NAVAL MEDICAL RESEARCH AND DEVELOPMENT NEWS

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Secretary of the Navy Raymond Mabus Christens NAMRU-6



(From left) Capt. John W. Sanders, NAMRU-6 commanding officer; Secretary of the Navy (SECNAV) the Honorable Ray Mabus; and Peru Navy Vice Admiral Reynaldo Pizarro Antram following the christening of U.S. Naval Medical Research Center Unit No. 6 (NAMRU-6) in Lima, Peru. NAMRU-6 partners with the Peruvian army and navy to conduct research on and monitor a wide range of infectious diseases that threaten military operations in the region. Photograph by Mass Communication Specialist 2nd Class Kevin S. O'Brien.

The christening of a new command does not happen very often - particularly a christening performed by the Secretary of the Navy. But that is exactly what happened January 13 in Lima, Peru when Secretary Raymond Mabus christened the newly created U.S. Naval Medical Research Unit No. 6 ([NAMRU-6](#)). Secretary Mabus was in Lima and met with the Peruvian Minister of Defense Jaime Thorne Leon as part of an eleven-day trip to six Latin American countries. The Secretary

met with the NAMRU-6 staff January 13 and learned more about one of his newest commands.

Also attending the ceremony were U.S. Ambassador to Peru, Rose Likens; Vice Admiral Reynaldo Pizarro Antram, General Director of Material for the Peruvian Navy; and Capt. Joseph Piontek, the Senior Defense Official – Military Attaché to Peru.

During the ceremony, Mabus spoke about the importance of the mission of NAMRU-6 and thanked the

staff for their dedication and hard work as part of the former Naval Medical Research Center Detachment – Peru (NMRCD). At the end of the ceremony, he and Admiral Pizarro pulled the cord to unveil the new command name on the front of building 1.

According to Capt. John W. Sanders, NAMRU-6 commanding officer, "The keel was laid for NAMRU-6 in 1983 with the foundation of NMRCD. It took 27 years to finish, but the ship has now been completed." Sanders closed the ceremony by presenting Mabus and Pizarro with a ceremonial plank from NAMRU-6.

A commissioning ceremony for the new command will be held February 10, but the Secretary's visit prompted scheduling of the christening and gave an opportunity to stretch a nautical analogy a little further.

Secretary Raymond "Ray" Mabus is the 75th United States Secretary of the Navy.

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Commanding Officer's Message

Turn on the news and the majority of the international headlines focus on the tenuous events in Cairo, Egypt. An additional focus for the Navy Medicine community is the safety and well-being of the U.S. Naval Medical Research Unit No. 3 staff members and their families. We are in close contact with our team and they and their families are doing well. The fluidity of the situation makes it nearly impossible to know the outcome, but one thing is for certain, we will look out for our U.S. and Egyptian staff and be flexible as these events unfold.

The laboratory traces its origins to 1942, when American scientists and technicians began working with Egyptian physicians at the Abbassia Fever Hospital in Cairo under the auspices of the U.S. Typhus Commission, established by President Franklin D. Roosevelt. Following World War II, the Egyptian Government invited the U.S. Navy to continue collaborative studies with Egyptian scientists on endemic tropical and subtropical disease. NAMRU-3 was formally established in 1946, and the laboratory has been in continuous operation despite several periods of political tension. NAMRU-3 is the largest overseas military medical research facility and one of the largest medical research laboratories in the North Africa-Middle East region. The lab's mission is to conduct infectious disease research, including the evaluation of vaccines, therapeutic agents, diagnostic assays and vector control measures and to conduct infectious disease surveillance and response activities and regional bio-security engagement. The laboratory plays a key role in enhancing the health, safety and readiness of DoD personnel assigned to Africa, the Middle East and Southwest Asia for peacetime and contingency missions and supports three COCOMS—EUCOM, CENTCOM and AFRICOM.



Commanding Officer sends,
Richard L. Haberberger, Jr.
CAPT, MSC, USN

Engineering Next Generation DNA Vaccines for Novel Pathogens



Dr. David B. Weiner

As part of the U.S. Military Malaria Vaccine Program (USMMVP), the Naval Medical Research Center (NMRC) hosted Dr. David B. Weiner, Professor of Pathology and Laboratory Medicine Chair in the Gene Therapy and Vaccine Program, University of Pennsylvania School of Medicine, to talk about DNA vaccines January 12. In a project

funded by the Malaria Vaccine Initiative at PATH, Weiner is developing a tetravalent DNA vaccine for the prevention of malaria.

Weiner spoke to a packed conference room on his pioneering work developing DNA vaccines. In the early 1990s, Weiner's group was one of the first to test DNA vaccines in animals and humans, working initially to develop therapeutic vaccines for cancer. More recently, Weiner developed and tested DNA vaccines for HIV and human papilloma virus.

"A collaboration is planned between Weiner's laboratory, an industry partner, and USMMVP to develop and test DNA vaccines for malaria," said Navy Capt. Thomas Richie, research coordinator for the USMMVP. "There is hope that the technologies developed in Weiner's laboratory will help to improve the protection we have achieved with a novel genetic vaccine against malaria here at NMRC."

The vaccine Richie and his team are working on consists of three priming doses of DNA followed by a boost with an adenovirus vector. Like DNA plasmid rings, the viral vector encodes the malaria proteins and leads to a potent immune response. The NMRC DNA/adenovirus prime/boost vaccine currently protects only about a fourth of those receiving the vaccine, and it is hoped that by using Weiner's improvements, the efficacy of the vaccine can be increased.

Most recently, Weiner, working in collaboration with a biotech company, has used electroporation to improve the efficiency of DNA uptake into host cells. Electroporation involves injecting the vaccine and then passing a brief electric pulse through the tissue, momentarily permeabilizing the cell membranes permitting increased DNA entry. These improvements – optimized plasmid design, cytokine adjuvants, and electroporation – have resulted in huge improvements in the immune response, rekindling excitement in this technology.

DNA vaccines are one form of genetic immunization, in which the DNA encoding a protein, rather than the protein itself, is injected. The DNA enters the vaccine recipient's cells, which express the malaria protein encoded by the DNA. The fact that the protein is expressed within the host cell, rather than administered exogenously, induces a different, potentially more powerful immune response than traditional protein-based vaccines.

Note from Kandahar - Director of Surgical Services, Navy Role 3 MMU

By Cmdr. Eric Elster, Director of Surgical Services

My job as the Director of Surgical Services (DSS) is to help manage this large combat surgical effort, but in fact, I am just one member of a highly capable multi-national medical team from the United States, Canada and the Netherlands. Every day of this deployment serves as a constant reminder as to why I became a Navy surgeon. The experience of being a part of the care that we are able to deliver here is truly rewarding. One can see for themselves just how far advanced combat care and research have come.

Casualties arrive here daily at our Navy Role 3 MMU Hospital in Kandahar, Afghanistan. Most of our patients will be in need of surgery within the first 24 hours of arrival. Many are in critical condition, and we work quickly to stabilize the patient. Some we simply cannot save despite our very best efforts and we certainly do everything we can to try to prevent that. Upon the arrival of casualties at the hospital, our teams immediately assess the wounded and take immediate action with state-of-the-art equipment at our disposal. Recently we have

had patients starting to arrive with higher penetrating blast wounds than had previously been seen in-theater. This has resulted in a noticeably higher rate of double and triple amputations, which is a subject worthy of research focus.

This mission is about life-saving efforts from the very start. Surgical procedures getting accomplished in a timely fashion can mean the difference between life and death and the quality of life for those who survive. This hospital is immersed in constant patient care of all kinds and the OR is always busy logging some 200 cases a month. To get a perspective on the volume and severity



Cmdr. Eric Elster, deputy department head for regenerative medicine, in his lab at the Naval Medical Research Center, Silver Spring, Md. Photograph by Lisa Nipp, Seapower Magazine.

of injuries, we average 1,000 units of blood products per month with 115 massive transfusions last year, as many as the largest U.S. trauma centers. The cases we see require extraordinary care and specialty focus.

With the multinational staffing, medicine is the common language we speak here. This includes a wide array of specialties such as trauma surgery, neurosurgery, oral and maxillofacial surgery, ophthalmology, orthopedics and anesthesia, amongst others. The insight and knowledge that we continue to gain here will have a lasting effect from the quality of care administered to the results of the numerous ongoing clinical trials for future warrior care.

Editor's note: Cmdr. Elster is serving a seven-month individual augmentee tour in Kandahar, Afghanistan. He is the deputy department head for regenerative medicine, [Naval Medical Research Center](#), Silver Spring, Md.



DSS staff outside of the facility. Photograph provided by DSS.

NAMRU-6 Helps Train Peruvian Epidemiology Researchers

By Lt. Jeremy H. Westcott, NAMRU-6
Public Affairs Officer

In December 2010, twenty students completed coursework for the Epidemiology Research Masters offered by the Universidad Peruana Cayetano Heredia (UPCH) in Lima, Peru. The university receives support and cooperation from the U.S. Naval Medical Research Unit No. 6 (NAMRU-6). Students were primarily young physicians and biologists working either in the Ministry of Health or the local Peruvian medical research community.

"The goal of this training is to prepare students to conduct independent epidemiological research with a solid quantitative foundation and to publish globally relevant research in a prestigious international peer-review journal," said Capt. John W. Sanders, commanding officer of NAMRU-6. "This is the third time we have offered this training, and I am very pleased to say prior students have gone on to develop prolific publication careers, conduct important research and have also joined world-class doctoral programs abroad."

"The coursework has four key areas that include epidemiology, biostatistics, protocol and publications develop-



NAMRU-6 entomologist Victor Zorrilla, far right, demonstrating the use of mosquito capture techniques and equipment.

ment, and research methods and applications," said Dr. Andres G. Lescano. "Students are required to prepare and receive approval for a

complete research protocol, conduct a data analysis and prepare a scientific manuscript, organize a funding application and present a scientific study orally."

Lescano went on to say that over 25 Peruvian and American doctoral-level scientists from UPCH, NAMRU-6, the University of California in Los Angeles, the Peruvian Ministry of Health and other organizations teach at the program on a regular basis.

The program is led by three Ph.D.-level scientists trained at Johns Hopkins University and two Ministry of Health physicians working in close coordination. The program is sponsored by the Fogarty International Center of the U.S. National Institutes of Health.

"At this point, the program is nearly self-sustainable due to its partnership with the local and international research community, and is considered a model for graduate training in Peru and abroad," said Lescano.



Cmdr. Joel M. Montgomery, Ph.D., head of NAMRU-6's emerging infections department, leading a field exercise on rodent trapping and necropsy.

Peruvian Navy Surgeon General Visits Naval Medical Research Center

Rear Admiral (Contralmirante) Mauro Cacho, recently appointed as the Surgeon General of the Peruvian Navy, visited the Naval Medical Research Center (NMRC) in Silver Spring, Md. January 19.

Cacho just completed an assignment as the Peruvian Naval Attaché to Washington, D.C. and was very interested in visiting NMRC before returning to Peru to assume his duties as Surgeon General.

While at NMRC, Cacho met with the Commanding Officer and senior staff and was given an overview of NMRC's research operations around the world, with special emphasis on the Navy's overseas labs, including the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) in Lima, Peru.

Following the briefing, Cacho was taken on a tour of the NMRC infectious disease laboratories.

The Peruvian Navy is the host agency for NAMRU-6, and NAMRU-6's main office and laboratory spaces in Lima are located on the grounds of Centro Medico Naval, the Peruvian equivalent of our National Naval Medical Center.

NAMRU-6 conducts infectious disease research and surveillance in South America that includes prevention strategies, drug and vaccine trials, and epidemiology. Researchers partner with the Peruvian Army and



Left to right: Dr. Stephen E. Walz, director, field laboratory operations; Capt. Eileen D. Villasante, executive officer; Capt. Richard L. Haberberger, Jr., commanding officer; Rear Admiral Mauro Cacho, Surgeon General of the Peruvian Navy; Cmdr. Kyle Petersen, prospective executive officer, NAMRU-6; Capt. Kevin R. Porter, director, infectious diseases directorate; Lt. Cmdr. Franca Jones, NMRC liaison to the office of science and technology policy, Executive Office of the President, Washington, D.C.

Navy, prestigious Peruvian universities like Cayetano-Heredia and San Marcos, the Peruvian Ministry of Health, the U.S. Agency for Interna-

tional Development, the U.S. Centers for Disease Control and Prevention, the U.S. National Institutes of Health and several American universities.

NMRC Enterics Diseases Department Hosts Campylobacter Seminar

By Dr. Alexander Maue, NMRC IDD (Enterics)

The Naval Medical Research Center (NMRC) Enteric Diseases Department hosted Dr. Stephen Trent, Associate Professor of Molecular Genetics and Microbiology, University of Texas-Austin, to present his work detailing surface antigens of *Campylobacter jejuni* January 12.

Trent spoke to the well-attended seminar about his research on how lipid modifications may represent an underappreciated component of

pathogenesis as well as assembly of larger protein complexes. Specifically, he demonstrated that when the gene for phosphoethanolamine transferase, a protein necessary for lipid modifications, was deleted in a strain of *C. jejuni*, it rendered the previously resistant bacterium sensitive to anti-bacterial molecules.

Perhaps the most surprising result of Trent's research was that removal of the transferase gene also resulted in a lack of motility. Further biochemical analyses showed that this loss of motility was due to an

inability to lipid modify the protein FlgG, a component of the flagellum, which ultimately affected the assembly of the larger protein complex.

Trent and his research team identified an unexpected link between two important virulence factors. He ended his presentation by saying that additional research is required to further characterize the roles of phosphoethanolamine transferases in the assembly of surface structures, pathogenesis and modification of lipids and proteins.

NAMRU-3 Gives Back to the Local Community in Cairo

By Darnell P. Gardner, Jr., Public Affairs Officer, NAMRU-3

In 2009, U.S. Naval Medical Research Unit No. 3 (NAMRU-3) began a partnership with Scientists for Egypt Next Generation (SNG). This organization was created by the Egyptian Ministry of Scientific Research and the Academy of Scientific Research and Technology (ARST) to foster innovation in young Egyptian researchers.

The most recent collaboration with ARST was in December 2010, when university students participated in a training seminar at NAMRU-3. The aim of the training was to demonstrate and emphasize the implementation of various aspects of laboratory safety and good laboratory practices (GLP). The curriculum was devoted to biosafety, identification of hazards, safety documentation, safety culture and occupational diseases, and critical analysis of scientific papers.

Dr. May El Sherif, NAMRU-3 medical research scientist, served as the training coordinator.

"Initially, I felt it was the right thing to do. You know, give back a little of my time for the betterment of our nation's future scientists," said Sherif. "But after interacting with the students, it turned into being a very personally rewarding experience. Mere words cannot explain what it's like to know that you increased future scientists' scope of knowledge in their particular fields of study."

NAMRU-3 Biosafety Officer

Dr. Hanan El Mohammady began her lectures by providing a broad overview of biosafety, including blood-borne pathogens, risk assessment and GLP. Classroom interaction started off with a



Mr. Ismail Raafat, NAMRU-3 Laboratory Technician, instructs students associated with Scientists for Egypt Next Generation (SNG) on how to dilute serum samples for enzyme-linked immunosorbent assay (ELISA) processing.

flood of eager questions; these, however, began to wane when Hanan transitioned to the use of relatively expensive, state-of-the-art laboratory equipment and supplies. It was noted by several students that some laboratories in Egypt do not have sufficient budgets to acquire such equipment and supplies, and they questioned the usefulness of this particular training. In response, Hanan quickly pointed out that having an understanding of how high-tech equipment works can spark creativity, which can lead to innovative ways to substitute basic equipment for more high-cost items.

"Our lesson plan was designed to encourage students to 'think outside of the box,'" explained Hanan. "By having a thorough understanding of how complex machinery works, students are

able to apply creative thinking to devise cheaper, alternative methods of accomplishing a desired task."

Dr. Samar, NAMRU-3 safety officer, presented two days of training on identification and abatement of hazards, safety documentation, ergonomics, hazardous materials, materials safety data sheets, spills, fire safety, emergency preparedness, and emergency planning.

Samar said, "Safety is crucial to the success of any biological laboratory. It is vital that we begin cultivating a culture of safety among our young scientists."

In keeping with the theme of creative thinking, Samar also encouraged students to apply their newly acquired skills to find ways to modify and reduce operating costs from a safety perspective.

Dr. Atef El Gendy, NAMRU-3 microbiologist, conducted a tour of the lab and explained how safety practices tie into the day-to-day operations of NAMRU-3 laboratories. Research technicians Mr. Bassem Abdel Rahman and Mr. Rafik Soliman were on hand to answer questions concerning laboratory activities and logistics.

NMRC in the news

OLTS Featured in DoD "Armed with Science" Blog



A recent NMR&D News article, "The Business of Science - Protecting Navy Medicine's Inventions," was featured in the Department of Defense's "Armed with Science" blog. [View the blog post.](#)

Joint NMRC/WRAIR Team Excels in 2010 Wilderness Challenge

The Naval Medical Research Center (NMRC) and the Walter Reed Army Institute of Research (WRAIR), Silver Spring, Maryland, fielded two joint teams at the 2010 Wilderness Challenge sponsored by Naval Weapons Station Yorktown Morale, Welfare and Recreation. The event is open to all active-duty military members and is currently in its tenth year.

Over the two-day endurance event, participants traveled a total of 50.1 miles through the West Virginia wilderness. Four-member teams from all branches of service and from bases throughout the U.S. converged in Fayetteville, West Virginia, October 8, 2010, to compete. Day one began with an 8-kilometer mountain run, followed by a whitewater raft race on the Gauley River, including navigation of class V rapids. Day two was a continuous event beginning in the morning with a 10-mile mountain bike race, then a two-person team in inflatable kayaks for an 8-mile race battling class I-III rapids on the New River, and ending with a 15-mile mountain hike race.

The Navy/Army teams excelled, placing eighth overall. The NMRC/WRAIR Surf and Turf 1 team included Army members Lt. Col. Erica Carroll, Maj. Carl Gorkos, Capt. Edwin Kamau and Navy member HM2 Timothy Velasco. The



Team Surf and Turf 2 tackles Class V rapids on the Gauley River.

NMRC/WRAIR Surf and Turf 2 team included Navy members Capt. Stephen Savarino and Lt. Michael Prouty and Army members Maj. Russell Giese and Capt. Rachel Stonesifer.

If you are interested in competing next year, keep an eye out for announcements this summer regarding team formation. To learn more about the Wilderness Challenge, please visit www.wildernesschallenge.net.

Greetings from the NMRC Ombudsman!

I hope everyone is having a successful start to 2011. With the New Year fully under way, this is a great time to take a personal inventory and try to develop a rewarding work-family balance. Many of us are overwhelmed on a daily basis because we try to take on too much. Evaluate what is really important to you and find out what your family truly values. Cut back on activities that don't matter as much to you and focus on protecting your personal time. Protecting private time usually means greater productivity and satisfaction. So look to achieve that balance in 2011 that is sure to bring you peace, happiness and even some fun.

Tax Time: Yes, it's that time of year again. For many of us, it can be a very daunting task to file taxes when dealing with so many issues such as both federal and state taxes, making sure you get your maximum refund, or worrying about filing when your sailor is deployed. MilitaryOneSource is once again providing free online tax filing services to all active duty, National Guard, and Reserve Service Members and their families. Tax consultants will be available 7 days a week from 7 am – 11 pm ET to help guide you through the process. Please check out this website and take advantage of this wonderful service: <http://www.militaryonesource.com/MOS/FindInformation/Category/TaxFilingServices.aspx>

Also, taxpayers now have a simpler way to add to their savings. Using Form 8888, Direct Deposit of Refund to More Than One Account, taxpayers can direct-deposit tax refunds into up to three accounts, making it easy to save a portion of their refunds. Allocate some for expenses, invest some in a long-term goal and save some for emergency funds.

Hero Miles: Want a way to help wounded warriors, but short on cash for donations? Donate airline miles instead. The Fisher House Foundation has been administering the Hero Miles program since 2005 providing more than 21,000 airline tickets. It is a popular program that turns donated frequent-flyer miles into free airline tickets for wounded warriors receiving medical care as well as their families. The program provides free round-trip airline tickets either to service members on at least five days of approved leave from their medical center who don't qualify for government-funded airfare, or to qualified service members to enable their family or close friends to visit them while they're being treated at a medical center. Check out <http://www.fisherhouse.org/programs/heromiles.html> to learn more.

If you need help finding all the great resources the military has to offer or just need someone to talk to, please contact me at angela.prouty@med.navy.mil or 217-722-4981.

Angela Prouty
Ombudsman, NMRC

Who We Are - Naval Submarine Medical Research Laboratory

Renovations Move Forward, Research Continues Uninterrupted



The Naval Submarine Medical Research Laboratory (NSMRL), based at the New London Submarine Base (SUBASE) in Groton, Conn., is the only Department of Defense laboratory dedicated to research in submarine and diving medicine.

Planning and coordination of current renovations have not interfered with research efforts. Starting in 2009, NSMRL moved from three buildings into two renovated spaces that will be bridged by a second story medical library. Updated communication and data infrastructure will complete the renovation, giving NSMRL both updated research laboratory facilities and support structure.

"The new facilities are an enormous improvement over the dated buildings," said Capt. Paul Kelleher, NSMRL commanding officer. "Although there have been many challenges during the refurbishment and multiple moves, the NSMRL staff have been exceptional in their support and collaboration. The modern facilities will be a certain boon for morale and productivity."

NSMRL researches undersea human systems integration, submarine survival and rescue, submarine medicine, diver bio-effects, hearing conservation and situational awareness.

NSMRL's focus on Human Systems Integration (HSI) brings together human factors with training, manpower, survivability and more by recognizing that HSI is a key factor in optimizing systems performance. One of the most exciting developments at NSMRL is significant advances in researching potential displays for a 360-degree periscope. Incorporating second-life simulation components, researchers can control several factors of the experiment design, including weather, lighting, equipment mishaps and more, to better understand integration of the operator into the system.

NSMRL performs research and provides expertise in the complex problems of living in the closed submarine environment while breathing continually recirculated air, addressing such issues as identifying optimal watch schedules and shipboard lighting. The lab performed groundbreaking research addressing problems arising from a potential submarine sinking or other disaster with tests and evaluation of equipment, methods and procedures for surviving in a disabled submarine until rescue or escape to the ocean surface. NSMRL's latest efforts have resulted in major contributions to the submarine survival and escape guidance manual, the Guard Book. Dr. Wayne Horn, NSMRL medical director, provided recommendations to the Chilean mine disaster response team based on lessons learned from prior research in submarine survival.

The lab has a full-time staff of thirteen Ph.D. and medical senior investigators, four M.S. investigators, ten staff members in research and engineering support, five Navy divers and twelve operational support personnel.

NSMRL's diving facilities include three hyperbaric chambers, dodge pond (Naval Undersea Warfare Center (NUWC)) and a dive boat, as well as acoustic facilities, including a 1000 cubic meter anechoic chamber, a 140 cubic meter reverberant chamber and ten audio testing booths.

To achieve its mission, NSMRL works with government, industrial, and university partners, including NUWC, Naval Medical Center San Diego, NASA, NAVSEA, Naval Expeditionary Diving Unit, U.S. Army Research Institute of Environmental Medicine, the University of Rochester and MIT.



U.S. Navy Lt. Heath G. Gasier, Research Physiologist, Submarine Medicine and Survival Systems Department, prepares a sample for analysis in the new testing lab at NSMRL.

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